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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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03/29/2001

Eiji Natori

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07/03/2002

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EXAMINER

RUSSELL, VOLITA S

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 07/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/819,687

Applicant(s)

NATORI, EIJI

Examiner

Volita S. Russell

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2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 41-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. This office action is in response to election filed on 5/10/02. Group II, claims 41-50, were non-elected and withdrawn from consideration. Group I, claims 1-40, were elected with traverse and are currently pending.

#### *Election*

2. Applicant's election with traverse of Group I, claims 1-40, in Paper No. 10 is acknowledged. The traversal is on the ground(s) that no reason was given as to why the invention of Group I is distinct or independent from the invention of Group II. This is not found persuasive because the ceramic of claim 41 can be formed without generating an electromagnetic wave, such as by a reactive sputtering method in an oxygen atmosphere or by spray pyrolyzing a mixed metal organic precursor solution onto a metallic substrate.

The requirement is still deemed proper and is therefore made FINAL.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 23-25 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Naoko et al. (JP 11-193472).

Re claims 1-2 and 35, Naoko et al. disclose (in English abstract) a method of forming a thin film of crystallized transition metal oxide, comprising a step of forming a ceramic (metal oxide) film on a substrate by feeding an ultraviolet light and alkoxide of salt of transition metal as a raw material on the surface of an object.

Re claim 3, Naoko et al. discloses a method of forming a thin film of crystallized transition metal oxide, comprising a step of feeding an ultraviolet light and alkoxide of salt of transition metal as a raw material to a metal oxide to form a coating film with has a crystal structure different from the metal oxide.

Re claims 23-25, Naoko et al. discloses a method of forming a thin film of crystallized transition metal oxide, comprising a first step of forming a first ceramic film (metal oxide) on a substrate; and a second step of feeding an ultraviolet light and alkoxide of salt of transition metal as a raw material to a metal oxide to the metal oxide to form a second ceramic film (coating film) which had a different crystal structure from the first film, wherein a film having a thickness is formed by the first and second steps.

4. Claims 1-4, 6, 8-18, 20-25, 27, 29, 31-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Narwankar et al. (6,204,203).

Re claims 1-2, 15, 17, 18, 23-25, 27, and 35, Narwankar et al. disclose a method of forming a metal oxide dielectric film comprising, a step of forming a ceramic film (208) on part of a substrate (201) by feeding UV source and an active species of a substance which is part of raw materials to a predetermined region to form a polycrystalline film which has a different crystal structure than the amorphous film; wherein a film of predetermined thickness is formed

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by the first and second step (Figs. 2c-d; col. 5, lines 62-67; col. 6, lines 19-50; col. 7, lines 39-52).

Re claims 3-4, Narwankar et al. disclose a method of forming a metal oxide dielectric comprising, a step of feeding an active species and UV source to an amorphous film (208) to form a polycrystalline film which has a different crystal structure than the amorphous film. (see Abstract; Figs. 2c-d; col. 3, lines 38-50; col. 5, lines 62-67; col. 6, lines 19-50; col. 7, lines 39-52).

Re claims 6, 8, 21, 29, and 31, Narwankar et al. disclose wherein the active species of a substance, which is a part of raw materials for the amorphous metal oxide is ozone, obtained by activating a substance containing oxygen and nitrogen and an inert gas fed to a predetermined region. (col. 6, lines 24-50; col. 7, lines 26-52).

Re claims 9-10, 16, and 32-33, Narwankar et al. disclose wherein the thickness of the ceramic film is 5-20 nm. (col. 6, lines 41-45, 64-67; col. 7, lines 1-7).

Re claims 11-12, 20-22, and 34, Narwankar et al. disclose a method of forming a metal oxide dielectric, wherein a film having predetermined thickness is formed by repeating several times a step of forming a amorphous film (208) having a predetermined thickness by feeding a UV source and active species of a substance which is part of raw materials to a predetermined region. (Figs. 2c-d; col. 5, lines 62-67; col. 6, lines 19-50; col. 7, lines 39-52).

Re claims 13-14, Narwankar et al. disclose wherein the thickness of the amorphous and polycrystalline film is 5-20 nm. (col. 6, lines 41-45, 64-67; col. 7, lines 1-7).

Re claims 20 and 22, Narwankar et al. disclose wherein the active species of a substance, which is a part of raw materials for the amorphous metal oxide is ozone, obtained by activating a

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substance containing oxygen and nitrogen and an inert gas fed to a predetermined region. (col. 6, lines 24-50; col. 7, lines 26-52).

Re claims 37-40, Narwankar et al. disclose wherein the amorphous film or polycrystalline film is formed of ferroelectrics BST or PZT by CVD at a temperature of 400-850 degrees Celsius. Sputtering, coating and LSMCD are conventional methods of forming films of a semiconductor process. (col. 1, lines 22-26; col. 6, lines 11-30; col. 7, lines 26-30; col. 8, lines 26-30).

Re claim 36, in Narwankar it is inherent that the substrate is moved where the active species or UV source is fed to part of the substrate so that, the substrate would continue its processing to the next step of forming sequential films, therein moving away from the UV source.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naoko et al. (JP 11-193472) in view of Katsuto (JP 05-343642).

Naoko discloses the method as applied to claims 1-3, 15, 17, 23-25 and 35 above.

Re claims 4, 18 and 27, Naoko does not disclose forming the first ceramic film in an amorphous state.

However, Katsuto forms an amorphous dielectric film (105) on a substrate then irradiates it to form a crystallized film (107) by using ultraviolet rays. (in English Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first ceramic film of Naoko to in an amorphous state and then crystallize the film as taught by Katsuto. This is because of the desire to reduce grain diameter and make the film dense.

6. Claims 6-8, 20-22, 26, 29-31 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narwankar et al (6,204,203) in view of deRochemont et al. (6,027,826).

Narwankar disclose the methods as applied to claims 1-4, 6, 8-18, 20-25, 27, 29, 31-35, and 37-40 above.

Re claims 6-8, 20-22, 29-31, Narwankar does not disclose wherein the active species is a radical or an ion obtained by activating a substance containing nitrogen or oxygen.

However, deRochemont et al. disclose of ferroelectric ceramic oxides structures composed of ions, radical and ozone and inert gases comprising of oxygen and nitrogen. (col. 2, lines 17-56).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to alternatively employ a radical, ion, ozone or inert gases as an active species of the raw material as taught by deRochemont to activate the substance of Narwankar to obtain closed-packed structure for better performability.

Re claim 26, Narwankar does not disclose the method further comprising the step of forming a film-forming region having affinity to ceramics to be formed and a non-forming

region having no affinity to ceramics to be formed on a surface of the substrate. to form self-alignably a ceramic film in the film-forming region.

However, deRochemont et al. disclose a method of forming ceramics further comprising the step of forming a film-forming region having affinity to ceramics (31, 37, 39) to be formed and a non-forming region having no affinity to ceramics ( 29, 35) to be formed on a surface of the substrate, to form self-alignably a ceramic film in the film-forming region.(Fig. 4, col. 19, lines 44-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of forming ceramics as taught by deRochemont to form the amorphous metal oxide film of Narwankar. This is because of the desire to form a ceramic film at a selected portion on a substrate in a self-alignment manner.

Re claims 5, 19 and 28, in Narwankar discloses wherein an amorphous ceramic film having low crystallinity.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Volita S. Russell whose telephone number is 703.306.4826. The examiner can normally be reached on Monday - Thursday and every other Friday, 8am-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703.308.4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703.308.7722 for regular communications and 703.308.7724 for After Final communications.




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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0956.



VSR

June 28, 2002



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